

$$\frac{(q)_{\infty}^3}{(q^2; q^2)_{\infty}^3} = [J_0 - q + q^2 J_2]^3 \quad (10)$$

$$= (J_0^3 - 3q^5 J_2^2) + (-3J_0^2 q + q^6 J_2^3)$$

$$+ (3q^2 J_0^2 J_2 + 3J_0 q^2) + (-6q^3 J_0 J_2 - q^3)$$

$$+ (3J_0 q^4 J_2^2 + 3q^4 J_2)$$

$$= (J_0^3 - 3q^5 J_2^2) + q(q^5 J_2^3 - 3J_0^2)$$

$$+ 3q^2(J_0)(J_0 J_2 + 1) - q^3(1 + 6J_0 J_2)$$

$$+ 3J_2 q^4 (J_0 J_2 + 1).$$

Now $(q)_{\infty}^3 = \sum_{n \geq 0} (-1)^n (2n+1) q^{n(n+1)/2}$

n	$n(n+1)/2 \pmod{5}$
0	0
1	1
2	3
3	$6 \equiv 1$
4	0

Hence ~~the~~ The power series expansion of $(q)_{\infty}^3$ does not have terms involving q^{5n+2} & q^{5n+4} .